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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/939,106

Applicant(s)

SOKOLOV, STEPAN

Examiner

Insun Kang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2004 and 06 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 21-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 21-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/6/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the amendment filed 11/29/2004 and 1/6/2005.
2. As per applicant's request, claims 2 and 9-20 have been cancelled, claims 1 and 3-8 have been amended and claims 21-34 have been added.
3. Claims *1,3-8 and 21-34* are pending in the application.

Drawings

4. The objection to the drawings has been withdrawn due to the amendment to the drawings.

Claim Objections

5. Claim 1 is objected to because of the following informalities:

Per claim 1, there appears to be a minor error in line 1. The phrase, "used a virtual machine" appears to be corrected to "used in a virtual machine." In line 14, "instruction" needs to be plural. Appropriate correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 21-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 21-27 are non-statutory because they are directed to a "system" merely reciting a "system for storing ... wherein said computer system is capable of" performing

the steps of receiving, selecting, generating, etc. The claims do not recite a description of what the system actually was. The system is only capable of performing the recited steps. Causing an action or an intended action (capability) is different from actually performing an action. A system capable of performing the steps does not necessarily mean that the recited steps are actually performed by the system. Therefore, the system for storing values into local variables is only an intended action. Thus the claims represent non-functional descriptive material that is not capable of producing a useful result, and hence represent only abstract ideas. Therefore, the claims are non-statutory.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 3-8, 21-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 1 recites the limitation "said first sequences" in line 7. There is insufficient antecedent basis for this limitation in the claim. In line 11, "a second sequence" is unclear as to which sequence it is referring. It is interpreted as "the second sequence."

b. Per claim 8, it is unclear as to which Getfield and Astore they are referring in line 2. They are interpreted as "said Getfield" and "said Astore."

- c. Claim 21 recites the limitation "said first sequences" in line 6. There is insufficient antecedent basis for this limitation in the claim. In line 12, "a second sequence" is unclear as to which sequence it is referring. It is interpreted as "the second sequence."
- d. Per claim 27, it is unclear as to which Getfield and Astore they are referring in line 2. They are interpreted as "said Getfield" and "said Astore."
- e. Claim 28 recites the limitation "said first sequences" in line 7. There is insufficient antecedent basis for this limitation in the claim. In line 13, "a second sequence" is unclear as to which sequence it is referring. It is interpreted as "the second sequence."
- f. Per claim 34, it is unclear as to which Getfield and Astore they are referring. They are interpreted as "said Getfield" and "said Astore."

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1,3-8 and 21-34 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1, 3-8, and 22-35 of copending Application No.09/939310.

Although the conflicting claims are not identical, they are not patentably distinct from each other because they are directed to substantially the same invention and recites only obvious differences which would have been obvious to one of ordinary skill in the art of program development at the time of invention such as simply (i) replacing steps or elements along with their functions, and/or (ii) implementing the method steps with means for performing the steps, and/or (iii) implementing a system, computer readable medium having computer program for performing the method steps, as explained below.

The corresponding claims are as follows:

Instant claim:	copending claims:
1	1
3	3
4	4
5	5
6	6
7	7
8	8
21	22
22	23
23	24
24	25
25	26
26	27
27	28
28	29
29	30

30	31
31	32
32	33
33	34
34	35

Per claim 1:

Copending claim 1 recites:

-receiving a first sequence of bytecodes to be executed by said virtual machine; selecting at load time, a first-reduced instruction from a reduced set of virtual machine instructions, wherein said first-reduced instruction represents two or more different virtual machine instructions in said first sequences translating, at load time, said two or more different virtual machine instructions in said first sequence into said first-reduced instruction from said reduced set of virtual machine instructions ("receiving a first sequence of bytecodes to be executed by said virtual machine; selecting at load time, a first-reduced instruction from a reduced set of virtual machine instructions, wherein said first-reduced instruction represents two or more different virtual machine instructions in said first sequences translating, at load time, said two or more different virtual machine instructions in said first sequence into said first-reduced instruction from said reduced set of virtual machine instructions")

-generating after said translating, a second sequence of bytecodes that includes said first-reduced instruction, thereby representing said first sequence of bytecodes with a second sequence which includes at least one instruction from said reduced set of virtual machine instruction that replaces said two or more

different virtual machine instructions in said first sequence ("generating after said translating, a second sequence of bytecodes that includes said first-reduced instruction, thereby representing said first sequence of bytecodes with a second sequence which includes at least one instruction from said reduced set of virtual machine instruction that replaces said two or more different virtual machine instructions in said first sequence")

-determining at load time, whether said second sequence of bytecodes includes a Getfield instruction immediately followed by an Astore instruction; generating, at load time, a macro instruction that represents said Getfield instruction and said Astore instruction that immediately follows said Getfield instruction ; loading in said virtual machine prior to execution time, said macro instruction instead of said Getfield instruction and said Astore instruction and executing said macro instruction to store a value into a local variable, as further recited in the instant claim

1. The co-pending claim 1 does not explicitly recite that the exemplary bytecode sequence to replace is Getfield/Astore pair; instead, the co-pending claim recites another exemplary conventional sequence, New/Dup pair. However, as the instant specification states that these are only exemplary conventional sequences that can be replaced with macros ("The Java Bytecode instructions...can be conventional Java Bytecode instructions, for example, conventional instantiate a Java object," page 10 0028; "the Java Bytecode instructions which are replaced in the stream can be conventional Java Bytecode instructions which often appear in a sequence. One such example is the various combinations of the conventional instructions representing New

and Dup,” page 13 0037), it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the steps recited in the co-pending claim 1 by replacing the exemplary sequence, New/Dup, with another exemplary sequence, Getfield/Astore, as recited in instant claim 1, for the purpose of expediting the method.

Per claim 3:

The rejection of claim 1 is incorporated, and further, the instant claim recites the additional limitation, “said Java macro instruction is generated during a bytecode verification phase,” which corresponds to co-pending claim 3.

Per claim 4:

The rejection of claim 1 is incorporated, and further, the instant claim recites the additional limitation, “said virtual machine internally represents instructions as a pair of streams,” which corresponds to co-pending claim 4.

Per claim 5:

The rejection of claim 4 is incorporated, and further, the instant claim recites the additional limitation, “said pair of streams includes a code stream and a data stream, wherein said code stream is suitable for containing a code portion of said Java macro instruction, and wherein said data stream is suitable for containing data,” which corresponds to co-pending claim 5.

Per claim 6:

The rejection of claim 5 is incorporated, and further, the instant claim recites the additional limitation, "said macro instruction is generated only when said virtual machine determines that said macro instruction should be generated," which corresponds to co-pending claim 6.

Per claim 7:

The rejection of claim 6 is incorporated, and further, the instant claim recites the additional limitation, "said determination of whether said macro instruction should be generated is made based on a predetermined criteria ata," which corresponds to co-pending claim 7.

Per claim 8:

The rejection of claim 7 is incorporated, and further, the instant claim recites the additional limitation, "said predetermined criteria is whether a Getfield instruction is immediately followed by an Astore instruction more than a predetermined number of time," which corresponds to co-pending claim 8.

Per claims 21-27:

The rejection of claims 1 and 3-8 is respectively incorporated, and further, the instant claims recite a system corresponding to copending claims 22-28 respectively,

modified in the manner set forth above in connection with claims 1 and 3-8 respectively. It would have been obvious for one of ordinary skill in the art of program development to implement the copending method modified in the manner set forth above with a system including means for performing the steps of the copending method.

Per claims 28-34:

The rejection of claims 1 and 3-8 is respectively incorporated, and further, the instant claims recite a computer readable medium corresponding to copending claims 29-35 respectively, modified in the manner set forth above in connection with claims 1 and 3-8 respectively. It would have been obvious for one of ordinary skill in the art of program development to implement the copending method modified in the manner set forth above with a computer readable medium including means for performing the steps of the copending method.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1,3-8 and 21-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Clausen et al. ("Java Bytecode Compression for Low-End Embedded Systems," 5/2000) hereinafter referred to as "Clausen."

Per claim 1:

Clausen discloses:

- storing values in local variables used a virtual machine (i.e. "getfield instruction is used to extract the value... The repeated instruction sequences for accessing fields have been factorized into macro instructions," page 476 paragraphs 2-3)
- receiving a first sequence of bytecodes to be executed by said virtual machine: selecting at load time, a first-reduced instruction from a reduced set of virtual machine instructions, wherein said first-reduced instruction represents two or more different virtual machine instructions in said first sequences translating, at load time, said two or more different virtual machine instructions in said first sequence into said first-reduced instruction from said reduced set of virtual machine instructions (i.e. see Fig. 4)
- generating after said translating, a second sequence of bytecodes that includes said first-reduced instruction, thereby representing said first sequence of bytecodes with a second sequence which includes at least one instruction from said reduced set of virtual machine instruction that replaces said two or more different virtual machine instructions

in said first sequence determining at load time, whether said second sequence of bytcodes includes a Getfield instruction immediately followed by an Astore instruction generating, at load time, a macro instruction that represents said Getfield instruction and said Astore instruction that immediately follows said Getfield instruction (i.e. "Each sequence of bytecode instructions is called a pattern. Factorizing a program with respect to a pattern yields a reduced program, where each occurrence of the pattern has been replaced by the corresponding new instruction...repetitive instruction sequences are identified as patterns...the byte code is factorized with respect to these patterns, generating new instructions on-the-fly," page 477 paragraphs 1-3; see the getfield macro in Fig 4)

-loading in said virtual machine prior to execution time, said macro instruction instead of said Getfield instruction and said Astore instruction and executing said macro instruction to store a value into a local variable (i.e. "getfield instruction is used to extract the value...The repeated instruction sequences for accessing fields have been factorized into macro instructions," page 476 paragraphs 2-3)

as claimed.

Per claim 3:

The rejection of claim 1 is incorporated, and further, Clausen teaches:

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-said Java macro instruction is generated during a bytecode verification phase (i.e. page 479 5.1. Macro Representation, "bytecode verifier") as claimed.

Per claim 4:

The rejection of claim 1 is incorporated, and further, Clausen teaches:

- said virtual machine internally represents instructions as a pair of streams(i.e. page 479, 5. Implementing an extensible JVM, 5.1 Macro representation) as claimed.

Per claim 5:

The rejection of claim 4 is incorporated, and further, Clausen teaches:

- said pair of streams includes a code stream and a data stream, wherein said code stream is suitable for containing a code portion of said Java macro instruction, and wherein said data stream is suitable for containing data .(i.e. page 479, 5. Implementing an extensible JVM, 5.1 Macro representation) as claimed.

Per claim 6:

The rejection of claim 5 is incorporated, and further, Clausen teaches:

- said macro instruction is generated only when said virtual machine determines that said macro instruction should be generated (i.e. "Macros are generated greedily by selecting the occurrence group that gives most savings first and continuing," page 478, 4.2 Pattern application) as claimed.

Per claim 7:

The rejection of claim 6 is incorporated, and further, Clausen teaches:

- said determination of whether said macro instruction should be generated is made based on a predetermined criteria (i.e. "repetitive instruction sequences are identified as patterns," page 477 paragraphs 3-5; section 4.1 Pattern Generation; "Macros are generated greedily by selecting the occurrence group that gives most savings first and continuing," page 478, 4.2 Pattern application) as claimed.

Per claim 8:

The rejection of claim 7 is incorporated, and further, Clausen teaches:

- said predetermined criteria is whether a Getfield instruction is immediately followed by an Astore instruction more than a predetermined number of times (i.e. "repetitive instruction sequences are identified as patterns," page 477 paragraphs 3-5; section 4.1 Pattern Generation; "Macros are generated greedily by selecting the occurrence group that gives most savings first and continuing," page 478, 4.2 Pattern application) as claimed.

Per claims 21-27, they are the system versions of claims 1 and 3-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1 and 3-8 above.

Per claims 28-34, they are the computer readable medium versions of claims 1 and 3-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1 and 3-8 above.

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14. Claims 1,3-8 and 21-34 are rejected under 35 U.S.C. 102(b) as being anticipated by O'Connor et al. (US Patent 6,026,485) hereinafter referred to as "O'Connor."

Per claim 1:

O'Connor discloses:

- storing values in local variables used a virtual machine receiving a first sequence of bytecodes to be executed by said virtual machine (i.e. col. 38, Getfield-putfield Accelerator line 7-22)
- selecting at load time, a first-reduced instruction from a reduced set of virtual machine instructions, wherein said first-reduced instruction represents two or more different virtual machine instructions in said first sequences
- translating, at load time, said two or more different virtual machine instructions in said first sequence into said first-reduced instruction from said reduced set of virtual machine instructions (i.e. col. 37 Getfield-putfield Accelerator line 55-67)
- generating after said translating, a second sequence of bytecodes that includes said first-reduced instruction, thereby representing said first sequence of bytecodes with a second sequence which includes at least one instruction from said reduced set of virtual machine instruction that replaces said two or more different virtual machine instructions in said first sequence
- determining at load time, whether said second sequence of bytecodes includes a Getfield instruction immediately followed by an Astore instruction

generating, at load time, a macro instruction that represents said Getfield instruction and said Astore instruction that immediately follows said Getfield instruction (i.e. col. 38, Getfield-putfield Accelerator line 7-22)
-loading in said virtual machine prior to execution time, said macro instruction instead of said Getfield instruction and said Astore instruction and executing said macro instruction to store a value into a local variable (i.e. col. 38, Getfield-putfield Accelerator line 7-22) as claimed.

Per claim 3:

The rejection of claim 1 is incorporated, and further, O'Connor teaches:

-said Java macro instruction is generated during a bytecode verification phase (i.e. col. 27 , "Fold determination portion," lines 9-25) as claimed.

Per claim 4:

The rejection of claim 1 is incorporated, and further, O'Connor teaches:

- said virtual machine internally represents instructions as a pair of streams(i.e. col. 42 lines 49-67) as claimed.

Per claim 5:

The rejection of claim 4 is incorporated, and further, O'Connor teaches:

- said pair of streams includes a code stream and a data stream, wherein said code stream is suitable for containing a code portion of said Java macro instruction, and wherein said data stream is suitable for containing data (i.e. col. 38, Getfield-putfield Accelerator line 7-22) as claimed.

Per claim 6:

The rejection of claim 5 is incorporated, and further, O'Connor teaches:

- said macro instruction is generated only when said virtual machine determines that said macro instruction should be generated (i.e. col. 27 , "Fold determination portion," lines 9-25) as claimed.

Per claim 7:

The rejection of claim 6 is incorporated, and further, O'Connor teaches:

- said determination of whether said macro instruction should be generated is made based on a predetermined criteria (i.e. col. 27 , "Fold determination portion," lines 9-25) as claimed.

Per claim 8:

The rejection of claim 7 is incorporated, and further, O'Connor teaches:

- said predetermined criteria is whether a Getfield instruction is immediately followed by an Astore instruction more than a predetermined number of times (i.e. col. 27 , "Fold determination portion," lines 9-25) as claimed.

Per claims 21-27, they are the system versions of claims 1 and 3-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1 and 3-8 above.

Per claims 28-34, they are the computer readable medium versions of claims 1 and 3-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1 and 3-8 above.

Response to Amendment

15. The amendments to the claims filed on 11/29/2004 do not comply with the requirements of 37 CFR 1.121(c) because:

In claim 6 of the amendment, the phrase, "macro instruction should" was presented in the previous version. However, the portion is underlined.

The examiner considers that the underline is a simple error; therefore, the amendment filed 11/29/2004 is examined to expedite the prosecution. However, the new corrected amendment is required upon response to this office action.

Response to Arguments

16. Applicant's arguments with respect to claims 1 and 3-8 and 21-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 571-272-3724. The examiner can normally be reached on M-F 7:30-4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 571-272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

I. Kang
Examiner
4/13/2005


KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100